

## River Basin Management and Information Technology



*From inside the boat or along the banks, the river can be unpredictable and unforgiving, however from a River Basin perspective, this is a tremendous resource which has the potential to be managed for the perpetual benefit of social, economic and environmental prosperity.*

**River basins and their effective management are quickly becoming critical issues for government authorities, conservation groups, local citizens, farmers, industry and others – each with their own specific priorities. This has created a demand for more efficient river basin management systems to cope with a multitude of increasingly complex tasks throughout the river basin domain.**

These tasks can include:

- ◆ River basin land use planning
- ◆ Water quality and supply management
- ◆ Flood & drought prediction, mitigation and response
- ◆ Coastal zone management

River basin management is all about making an informed decision to guarantee water supplies in the future, while ensuring

the highest sustainable degree of river safety, water quality and availability for today.

These are demanding challenges constantly requiring new and innovative approaches. Many organizations have discovered an important link between river basin management and information management.

IT (Information Technology), such as computer networking, visualization, database management, computer-based monitoring and control, GIS (geographic information systems), satellite remote sensing, simulation, and decision-support systems are some of the tools which are now used to help organizations achieve their river management objectives.

## River Basin Land Use Planning

River basin planning involves complex relationships among local community development plans, land use strategies, such as forestry management and agriculture, water supply and waste water utility services, river engineering control technologies, and water conservation awareness education programs.

Each infrastructure, human development, land use or ecological action in a region has a series of corresponding impacts elsewhere within the river basin. For managing such a complex environment, a river basin-wide systems approach is essential.

Information technology is an important tool in helping to identify and understand these inter-dependent relationships.

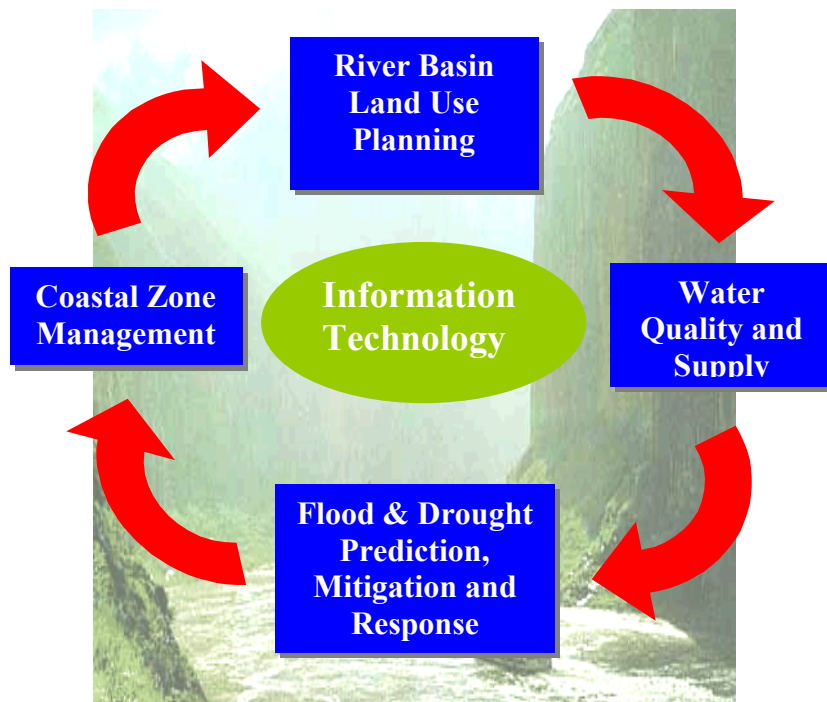
## Water Quality and Supply Management

The water we drink is a natural resource requiring the highest quality and distribution standards. Methods of managing local water supply are having to become increasingly sophisticated. They need to ensure that water for human consumption is safe to drink and is plentiful at all times of the day and night, all year round – and at a reasonable cost to the consumers.

Many water utility companies are now under pressure from local communities, monitoring groups and national

regulatory bodies to demonstrate full compliance with stricter water quality

demanding a regular flow of monitoring and analytical data from water companies.



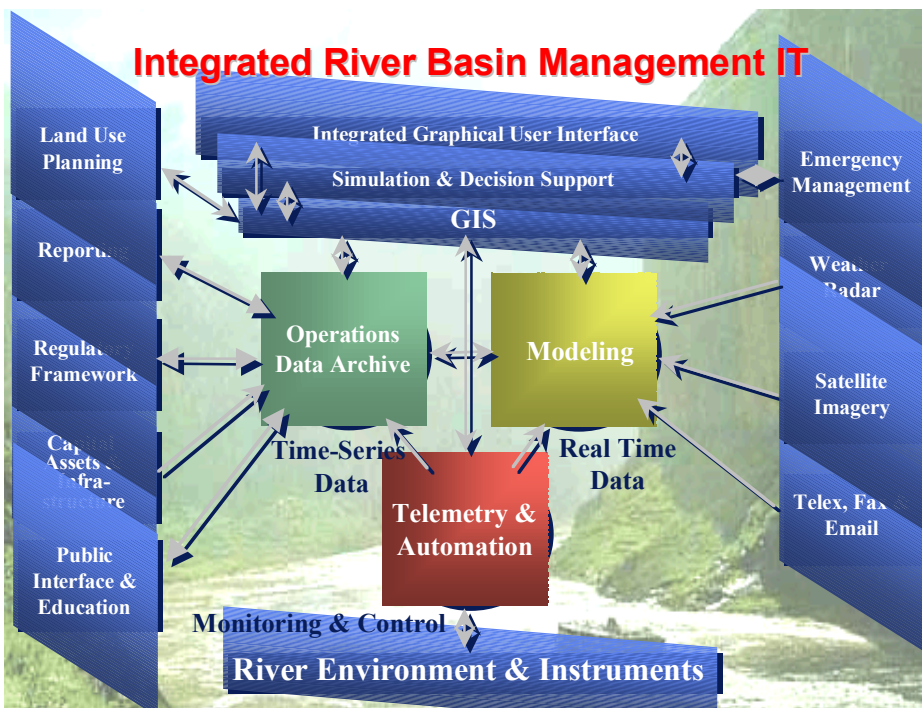
regulations that are emerging worldwide. Protection of this valuable resource is a shared responsibility by the water authorities, and also the local communities, farmers and citizens within the watershed region.

In the United States, for example, clean water legislation provides for heavy fines for water pollution. Companies must now ensure that their waste water is properly treated before putting it back into the environment.

Protecting our ground water and aquifers from pollution is now facilitated by 3-dimensional maps and computer models which track the location and predict the migration of underground pollution plumes.

In many parts of the world, regulatory bodies are

This is usually collected and analyzed by using water monitoring instruments connected to data collection computer systems and then analyzed and distributed to water facility managers for decisions to ensure compliance with pre-determined norms. In the event of the detection of serious problems alarms and warnings can be issued to down-stream communities in order to minimize public health emergencies. Today, local operations are aided by databases which act as the central repository for monitoring data, ensuring access to current and historical data on water quality, quantity and biological information. Water plants are now aided by SCADA (Supervisory Control and Data Acquisition) information management systems, enabling more efficient and



responsible remote monitoring and control of operational sites.

The maintenance and management of water plans and equipment is another critical area of concern. In areas where aging pipe networks and infrastructures are requiring constant maintenance, telemetry and GIS (Geographic Information Systems) play an important role. The location on a map of water leakage from aging pipes is one example how GIS can be utilized to improve maintenance and reduce waste.

### **Flood & Drought Prediction, Mitigation and Response**

Water flows downhill throughout the river basin – sometimes with devastating speed and power. Protecting against loss of life, property

and economic activity are the most challenging tasks within a river basin system.

Through the use of GIS and remote sensing applications, together with historical river data, very accurate maps can be produced, predicting where floods and droughts are most likely to occur. These tools are important in developing local community plans and actions to reduce flood risks. Such actions can take the form of flood-proofing buildings and neighborhoods, emergency response plans, revising building codes and zoning regulations, and raising local awareness of river conservation methods.

Links to weather forecasting data, computer simulation and decision support systems are also an important aspect of flood and drought prediction and response capability

### **Coastal Zone Management**

Coastal zone management requires a constant vigil. The vast stretches of water in coastal areas change flow and level according to even minimal climatic changes, and Man's quest to control these coastal zones requires a constant intelligence and care. Care of the coast now reaches beyond navigational guards, or management and flood defense to deal more and more with environmental issues and heavy pollution occurring in wider stretches of coastal river basins.

In many countries, government directives regarding dangerous substances set the framework for the elimination or reduction of substances such as mercury, cadmium, carbon tetrachloride, pesticides, chloroform, and petroleum.

Satellite remote sensing with infrared sensors coupled with ins-situ monitoring instruments are now used to track and predict pollution, salinization levels, changes in the amount and location of wetlands, fishery conditions and human development along coastal areas.

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Compaq is also proud to be one of the ten permanent founders of the Stockholm Water Prize which is awarded annually by the Stockholm Water Foundation for outstanding achievements in protecting the world's water resources.

We at Compaq understand our customer's business. Compaq has long been an innovator in providing information technology solutions in all sectors of the water industry. With leading application and integration business partners, and dedicated specialists in the utility, water and environmental fields, we have broad experience in developing water management solutions, and in helping our customers to implement and integrate those solutions.

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#### **China**

Brett Li  
Compaq Utility & Water  
Business Development  
6 Floor Full Link Plaza  
Beijing, China  
Tel: 86-10-6588-7888  
Email: [brett.li@compaq.com](mailto:brett.li@compaq.com)

Smith Sun  
Eastern China Utility and  
Water Business Office  
23<sup>rd</sup> Floor, Metro Tower  
Shanghai, China  
Tel: 86-21-6427-3698  
Email: [smith.sun@compaq.com](mailto:smith.sun@compaq.com)

#### **USA**

Scott Cox  
Compaq Government GIS  
Development Office  
6406 Ivy Lane  
Greenbelt, MD  
Tel: 1-570-374-5211  
Email: [scott.cox@compaq.com](mailto:scott.cox@compaq.com)

#### **Europe**

Juergen Vollmer  
Compaq European GIS  
Development Office  
Munich, Germany  
Tel: 49-89-9392-2214  
Email: [juergen.vollmer@compaq.com](mailto:juergen.vollmer@compaq.com)

#### **Other Locations**

Michael Adams  
Corporate GIS Business  
Manager  
200 Forest St.  
Marlboro, MA USA  
Tel: 1-508-467-4423  
Email: [m.a.adams@compaq.com](mailto:m.a.adams@compaq.com)

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